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IS : 10106 (Part 3/Sec 2) - 1986

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PACKAGING CODE

PART 3 ANCILLARY MATERIALS

Section 2 Adhesive Tapes for Closing and Sealing

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PACKAGING CODE

PART 3 ANCILLARY MATERIALS

Section 2 Adhesive Tapes for Closing and Sealing

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PACKAGING CODE

PART 3 ANCILLARY MATERIALS

Section 2 Adhesive Tapes for Closing and Sealing

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 12 May 1986, after the draft finalized by the Packaging Code Sectional Committee had been approved by the Marine, Cargo Movement and Packaging Division Council.

0.2 The packaging code is being issued in the following parts, each having one or more sections:

Part 1 Product packaging
Part 2 Packaging materials
Part 3 Ancillary materials
Part 4 Packages
Part 5 Packaging operations
Part 6 Storage and transportation
Part 7 Packaging machinery

0.2.1 This section of the packaging code (Part 3/Sec 2) deals with adhesive tapes for closing and sealing.

0.3 In the preparation of this standard, guidance has been taken from the following publications:

a) IS : 2880-1978 Pressure sensitive adhesive cellulose tapes (*second revision*)

b) IS : 3676-1978 Pressure sensitive adhesive PVC tapes (*first revision*)

c) IS : 3687-1977 Pressure sensitive adhesive cloth tapes (*first revision*)

d) IS : 4185-1967 Adhesive paper tapes

e) BS 1133 : Section 14 : 1961 Packaging code: Adhesive closing and sealing tapes. British Standards Institution (BSI)

1. SCOPE

1.1 This standard (Part 3/Sec 2) lays down guidelines on the use of adhesive paper tapes and pressure-sensitive adhesive tapes.

2. TERMINOLOGY

2.1 For the purpose of this code, the definitions given in IS : 3434-1984* shall apply.

3. TYPES

3.1 Adhesive tapes shall be of following types:

a) Adhesive paper (gummed paper) tapes, and

b) Pressure sensitive adhesive tapes.

4. ADHESIVE PAPER TAPES

4.0 General — Adhesive paper tapes are manufactured by coating uniformly one side of the paper with a water soluble adhesive composition. These tapes are moistened with water prior to application. They are used for sealing corrugated and solid fibreboard containers, paperboard cartons/ boxes, small packages and bales. Requirements and methods of sampling and test for such tapes are given in IS : 4185-1967†.

4.1 Materials — The tape consists of hard-sized kraft paper or waterproof/ reinforced kraft paper or cloth based and coated uniformly on one side with adhesive as given below.

4.1.1 *Base Paper* — The base paper consists of kraft paper (*see* Grade 2 of IS : 1397-1967‡) (bleached or unbleached), hard-sized kraft paper or water-proof/reinforced kraft paper or cloth based to resist adhesive penetration and to be flexible to ensure folding and conformity with the shape of the package.

4.1.2 *Adhesive* — The adhesive shall be homogeneous and free from solid particles so as to give a smooth finish on application to the base paper. It shall emit no objectionable odour in either dry or wet state, shall readily adhere to the base paper and be quickly activated with water. The adhesive shall be such that on unwinding a roll of a gummed tape, adjacent layers shall show no signs of adhering to each other. The adhesive shall not contain any material which is toxic when used in direct contact with foodstuffs.

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*Glossary of terms for adhesives and pressure sensitive adhesive tapes (*first revision*).

†Specification for gummed paper tapes.

‡Specification for kraft paper (*first revision*).

4.2 Requirements — Adhesive paper tapes are available in a wide range of width and strengths and shall be chosen according to the size and mass of the package to be sealed. Table 1 gives a rough guide to this selection and also indicates the mass of adhesive coating appropriate to the particular type of package and tape. The bursting strength shall be tested in accordance with IS : 1060 (Part 1)-1966*.

TABLE 1 TYPICAL EXAMPLES OR USES OF ADHESIVE PAPER TAPES

TYPE OF PACKAGE (1)	MINIMUM BURSTING STRENGTH OF TAPE kgf/cm² (2)	MINIMUM WEIGHT OF ADHESIVE g/m² (3)	MINIMUM WIDTH OF TAPE cm (4)
Large heavy wrapped bales	4·9	28	10
Fibreboard cases	3·5	28	5
Paperboard boxes and cartons	3·5	28	5
Small packages	2·1	26	2·5

4.3 Adhesive Performance — A simple method of testing the adhesive performance of gummed paper tape is described in IS : 4185-1967†. When tested in accordance with this method, the adhesive properties of the tape shall satisfy the following requirements:

a) The gummed tape on being lifted from the corrugated board after the 5 seconds period of adhesion, shall show a pronounced tackiness.

b) When the gummed tape is separated from the board after the 50 seconds period of adhesion, some of the fibres of the board shall adhere to the tape.

c) It shall be impossible to separate the gummed tape from the board after the 2 hours period of adhesion, without damaging either the gummed tape or the board.

4.4 Application and Use

4.4.1 An efficient moistening machine should be employed. The machine and particularly the moistening device should be kept clean and the water in the tank maintained at the correct level. Application should follow immediately after moistening, the tape being well rubbed down. In very

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*Methods of sampling and test for paper and allied products : Part 1 (*revised*).

†Specification for gummed paper tapes.

cold weather, the adhesion of the tape is assisted if the water for moistening is kept reasonably warm.

4.4.2 A method of applying adhesive paper tape and the amounts required for the securing of fibreboard cases can be clearly seen from Fig. 1 which emphasizes the small quantity necessary; any excess sealing, such as, passing the tape around the case, serves no useful purpose. Small packages and large heavy wrapped bales should also be sealed in a similar economical manner. There are also fully automatic machines for sealing fibreboard cases with adhesive tape.

4.5 Packing and Storage — Adhesive tapes should be kept in the original waterproof wrappers until required for use and should be stored in a warm and dry place. They shall be packed to ensure adequate protection from damage in transportation and from deterioration due to climatic conditions. Extremes of temperature should be avoided. The tapes should not be stored on concrete floors which attract moisture.

5. PRESSURE SENSITIVE ADHESIVE TAPES

5.0 General — Pressure sensitive adhesive tapes need only the application of gentle pressure to cause them to adhere to almost any clean dry surface that is free from dust, oil, grease or moisture. Moistening or other preparation prior to application is thus avoided. Their chief functions are to ensure the security of the package, to protect the contents from outside contamination or damage, and to retard the entry of water and transmission of water vapour. They are used for the following purposes:

a) For sealing unit packages or containers made from paper, board, wood, metal or plastics;

b) For providing a means of reinforcement where necessary;

c) For securing or bundling together a number of units or packages or articles;

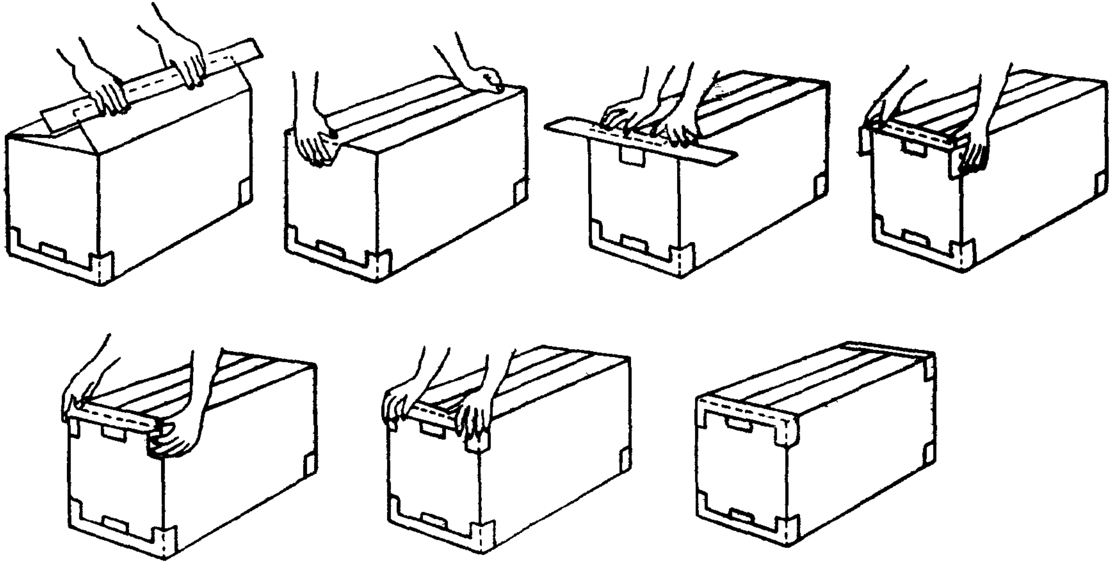
d) As tear tapes to facilitate the opening of containers or packages; and

e) As printed tapes for instructions, warning, information or decoration.

5.1 Types — Pressure sensitive adhesive tapes are of the following basic types:

a) Cloth tapes,

b) Cellulose tapes,



The end sealing can equally well be applied vertically to the main seam, but the corners should be protected.

FIG. 1 CONTAINER SEALING

c) PVC tapes,
d) BOPP tapes,
e) Polyester tapes,
f) Paper tapes, and
g) Others.

5.1.1 *Pressure Sensitive Adhesive Cloth Tapes* — These are specifically used for packing heavy articles such as pipelines, fittings, neon tubes and cables, so as to protect heavy polished surfaces against scratches and abrasions. They are also used for sealing bags, cans, cartons and other heavy duts containers to protect them from moisture and contamination. For further details, reference may be made to IS : 3687-1977*.

5.1.2 *Pressure Sensitive Adhesive Cellulose Tapes* — These tapes are suitable for temporary applications and are used for sealing packages, for bundling together various light and medium weight articles, for mending torn documents, for identification of parts in assembly kits, for carrying advertising message when printed. For further details, reference may be made to IS : 2880-1978†.

5.1.3 *Pressure Sensitive Adhesive PVC Tapes* — These are specifically used in defence packaging, identification of circuits, machine parts, aircraft and other engineering industries in packaging, sealing and labelling operations. For further details, *see* IS : 3676-1978‡.

5.1.4 *BOPP, Polyester and Paper Tapes* — These tapes are generally used for bundling of various articles and closing boxes, cartons and containers.

5.2 Materials — Pressure sensitive adhesive tapes consist of a wide range of base materials coated with an adhesive composition. The base materials include fabric such as cotton or rayon, proofed fabrics, paper and a variety of plastic films. The adhesive composition is generally based upon natural rubber or vorious synthetic elastomers or resins and the type used on a particular tape is that most appropriate to the type of base material and the application involved.

5.3 Properties

5.3.1 Properties of pressure sensitive adhesive tapes vary with the base material and adhesive used and are classified in Table 2. The terms used are explained below.

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*Specification for pressure sensitive adhesive cloth tapes (*first revision*).
†Specification for pressure sensitive adhesive cellulose tapes (*second revision*).
‡Specification for pressure sensitive adhesive PVC tapes (*first revision*).

5.3.1.1 *Tensile strength* — Ranges of tensile strength are classified as follows:

a) Very high: Greater than 27 kgf/cm width,

b) High: 9 to 27 kgf/cm width,

c) Medium: 2 to 9 kgf/cm width,

d) Low: Less than 2 kgf/cm width.

5.3.1.2 *Conformability* — The ability to mould to uneven surfaces (for example, over the lips of tin lids, etc).

5.3.1.3 *Transparency and colour* — Colour can be of great value in coding and identification of products and in the case of transparent tapes, for applications where the printing on the container or package shall remain visible.

5.3.1.4 *Printability* — Printing can be used to carry instructions or advertising matter on majority of tapes as well as for providing additional means of identification.

5.3.1.5 *Thickness* — Ranges of thickness, including the thickness of the adhesive are classified as follows:

a) Low: Less than 0·102 mm,

b) Medium: 0·102 to 0·305 mm,

c) High: Greater than 0·305 mm.

5.3.1.6 *Water resistance* — This is important when the contents need extra protection against water or rain.

5.3.1.7 *Water vapour permeability* — In humid conditions where protection is required to prevent the entry of water vapour, it is essential that water vapour permeability should be as low as possible. Water vapour permeability is defined as the weight of water vapour in grams transmitted per square metre per 24 hours (g/m^2 day) at a temperature of 38°C and a relative humidity of 98 percent. Ranges of water vapour permeability are classified as follows:

a) Very Low: Less than 20 g/m^2 day,

b) Low: 20 to 80 g/m^2 day,

c) Medium: 80 to 200 g/m^2 day, and

d) High: Greater than 200 g/m^2 day.

TABLE 2 PROPERTIES OF PRESSURE-SENSITIVE ADHESIVE TAPES

(*Clauses* 5.3.1 *and* 5.4.2)

TAPE DESCRIPTION (BACKING MATERIAL) (1)	TENSILE STRENGTH (2)	CONFORM-ABILITY (3)	COLOUR (4)	PRINTA-BILITY (5)	THICKNESS NORMALLY AVAILABLE (6)	WATER RESISTA-NCE (7)	WATER VAPOUR PERMEABILITY 8 (W.V.P.) (8)
Cellulose (regenerated)	Medium	Limited	Transparent and coloured	Yes	Low	Poor	High
Cellulose acetate	Medium	Limited	Transparent and coloured	Yes	Low	Good	Low
Ethyl cellulose	Medium	Moderate	Transparent and coloured	Yes	Low	Good	Low
Unplasticized PVC	Medium	Limited/ moderate	Transparent and coloured	Yes	Low	Good	Low
Plasticized PVC	Medium	Very good	Transparent and coloured	Yes	Medium	Good	Low
Polythene	Low	Very good	Transparent and coloured	No	Low/ medium	Good	Very low
Proofed cloth	Medium/ high	Moderate	Coloured	Yes	Medium/ high	Good	Low/medium
Unproofed cloth	Medium/ high	Good/ moderate	Natural and coloured	Yes	Medium/ high	Medium	High
Glass cloth	High	Good/ moderate	Natural	Yes	Medium/ high	Medium	High/medium

Proofed glass cloth	High	Good/ moderate	Coloured	Yes	Medium/ high	Good	Low
Creped paper	Medium	Good/ mederate	Natural and coloured	Yes	Medium	Medium	High/medium
Uncreped paper	Medium/ high	Limited	Natural and coloured	Yes	Medium/ high	Medium	High/medium
Weftless fabric	Very high	Limited	Natural and coloured	Yes	Medium/ high	Medium	High/medium
Polyester	Medium	Limited/ moderate	Transparent and coloured	Yes	Low	Good	Low/very low
Film backed filament, reinforced	Very high	Limited	Natural and coloured	Yes	Medium/ high	Good	Low
Film backed fabric, reinforced	Medium	Good/ moderate	Coloured	Yes	High	Good	Medium

5.4 Applications

5.4.1 *Use on Automatic Packaging Machines* — A wide variety of applications may be performed automatically by the choice of appropriate machine and tape from the large range available. The manufacturer should be consulted on this point if necessary.

5.4.2 *Temperature for Use of Tape* — All tapes listed in Table 2, with the exception of cellulose (regenerated) and cellulose acetate are suitable for use in cold conditions, including deep freeze, provided they are applied under normal atmospheric conditions.

5.5 Packing and Storage

5.5.1 The rolls of pressure adhesive tapes should be stored flat on their cut edges in their original unopened containers until required for use, and should be protected from dust, moisture, direct sunlight, corrosive and solvent fumes. They should be packed so that they do not adhere to each other or to the container and should be protected from damage in transportation and from deterioration due to climatic conditions. For optimum shelf life, the tapes should be stored at a temperature of 27 ± 2°C and 65 ± 5 percent relative humidity, unless specified otherwise. Higher temperatures and humid conditions accelerate deterioration of tape.